



MU123

Practice quizzes for Units 1 to 4 (Set 2)

Note that the questions in this document are designed for on screen usage via the course website. Some of the instructions within questions may not quite suit this printed version, e.g. when the question refers to 'box below' this should be interpreted as 'box in margin'.

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Unit 1 practice quiz questions

Question 1

What is the correct answer for the following calculation?

$$40 - 16 \div 8$$

Answer:

Question 2

Select the option that is the value of the expression

$$7 + 8 \times 2 + 3.$$

Options

A 62 B 47 C 33 D 26 E 210

Answer:

Question 3

Which two of the following quantities are equivalent to 67 g?

Options

A 6700000 mg B 0.00067 kg C 0.0067 kg D 6.7 kg
 E 0.067 kg F 67000 mg G 670000 mg H 0.670 kg
 I 6700 mg J 670 mg

Answer:

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Question 4

Round 5.01628 to various numbers of decimal places to make the following statements true.

5.01628 rounded to 4 decimal places is

5.01628 rounded to 2 decimal places is

5.01628 rounded to 1 decimal place is

Options

A 5.0162 B 5.016 C 5.017 D 5.1 E 5.01
 F 50. G 5.0 H 5.0163 I 5.02

Question 5

3 adults and 3 children are going out to an exhibition, which charges an entrance fee of £5.60 for adults and £2.90 for children. Give an estimate to the nearest pound for the amount which it will cost for all the tickets.

(Your answer should be a number, without a £ sign.)

Answer:

Question 6

Select the correct answer to the following calculations from the drop down list.

$7 - (-4) \dots\dots\dots$

$7 + (-4) \dots\dots\dots$

$(-7) \times (-4) \dots\dots\dots$

$7 \times (-4) \dots\dots\dots$

$8 \div (-4) \dots\dots\dots$

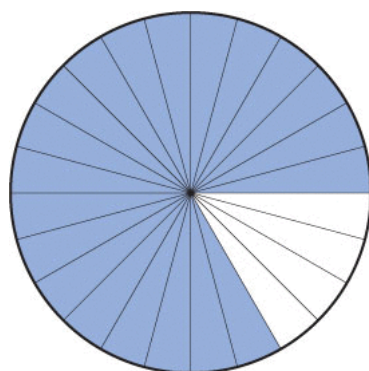
Options

A -3 **B** -11 **C** 11 **D** 3 **E** -2

F 28 **G** 2 **H** -28

Question 7

In a school class election for form captain, 24 students were entitled to vote. The figure below shows how many of them actually voted. The number of blue sectors represent those who voted and the number of white sectors represent those who did not.



Select the option that corresponds to the fraction of eligible voters who actually voted in its simplest form.

Options

A $\frac{5}{6}$ **B** $\frac{19}{24}$ **C** $\frac{20}{24}$ **D** $\frac{7}{8}$ **E** $\frac{1}{6}$

Answer:

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Question 8

In a survey of 100 fathers, 75 said they worried about the future.

Calculate, in simplest terms, the fraction of fathers who worried about the future and select the numerator and denominator of this fraction from the drop-down lists below.

Numerator:.....

Denominator:.....

Options

A 6	B 3	C 30	D 7	E 8
F 9	G 2	H 5	I 1	J 40
K 75	L 10	M 45	N 25	O 35
P 20	Q 15	R 4	S 100	

Question 9

In a group of 30 adults, $\frac{5}{6}$ of them said that roses were their favourite flower. How many of the adults had different favourite flowers? Enter your answer in the box below.

(Your answer should be a number.)

Answer:

Question 10

Express the fraction $\frac{8}{9}$ as a decimal, rounded to two decimal places.

Enter your answer in the box below.

Answer:

Question 11

A jumper costs £70 and then the price is reduced by 20% in a sale. Calculate the reduced price of the jumper.

(Give your answer as a number, without a £ sign.)

Answer:

Question 12

How many TMAs are there in MU123?

Answer:

Unit 2 practice quiz questions

Question 1

A map scale is given in words as: '1 cm represents 250 m'.

What is the scale factor?

(Your answer should be a number.)

Answer:

Question 2

A map scale is given as 1:625000.

What distance in metres is represented by 1 cm on the map?

(Your answer should be a number, without units.)

Answer:

Question 3

The scale of a map is 1:625000.

The distance between two places on the map is 5.0 cm.

What is the corresponding ground distance in m?

(Your answer should be a number, without units.)

Answer:

Question 4

The scale of a map is 1:625000.

The distance between two places on the ground is 5 km.

What is the corresponding map distance in cm?

(Your answer should be a number, without units.)

Answer:

Question 5

A motorcycle travels 70 km in 40 minutes.

What is the average speed of the motorcycle in km/h?

(Your answer should be a number, without units.)

Answer:

Question 6

A sponsored walk of 2.0 km started at 2:55 pm and finished at 3:21 pm.

What was the average speed in kilometres per hour, rounded to two significant figures?

(Your answer should be a number, without units.)

Answer:

Practice quizzes for Units 1 to 4 (Set 2)

Question 7

Find the time for a journey of 60 km travelled at an average speed of 95 km/h.
Give your answer in minutes, to the nearest minute.
(Your answer should be a number, without units.)

Answer:

Question 8

Convert the speed of 27 m/s to km/h.
Give your answer to the nearest whole number.
(Your answer should be a number, without units.)

Answer:

Question 9

The measurement 56.7 has been rounded to 3 significant figures.
The inequality for the values which round to 56.7 is (where v represents a value):

Options

- A** $56.6 > v \geq 56.8$ **B** $56.65 \leq v < 56.75$ **C** $56.65 < v \leq 56.75$
D $56.6 \leq v < 56.8$ **E** $56.65 \geq v > 56.75$

Answer:

Question 10

Choose the description from the drop down list that correctly matches each of the following expressions.

$6c + 3$

$(c - 5)^2$

$6(c + 3)$

$c^2 - 5$

Options

- A** Subtract the number from 5, then square your answer.
B Square the number, then subtract 5 squared.
C Multiply the number by 6 and then add 3.
D Subtract 5 from the number and then square your answer.
E Add 3 to the number and multiply your answer by 6.
F Square the number and then subtract 5.
G Multiply your number by 6 and then by 3.

Question 11

What is the value of

$$6n + 2 + \frac{333.66}{6 + 9n}$$

when $n = 3.8$?

(Your answer should be a number.)

Answer:

Question 12

Let $n = 1.2$.

Work out the values of the following expressions and choose the correct option (rounded where appropriate) from the drop down boxes:

$$8(3 - 2n) + 2 \dots\dots\dots$$

$$8(3n)^4 \dots\dots\dots$$

$$(8 + 3n)^3 \dots\dots\dots$$

$$\frac{8+3n}{2} \dots\dots\dots$$

$$\frac{8}{2+3n} \dots\dots\dots$$

Options

- | | | | | |
|-----------------|----------------|-------------------|------------------|-------------------|
| A 5.8 | B 37.6 | C 49.7664 | D 11.1 | E 6.8 |
| F 54.656 | G 7.6 | H 1343.693 | I 517.184 | J 1560.896 |
| K 23.6 | L 1.429 | M 558.656 | | |

Question 13

The monthly cost for a mobile phone is given by the formula:

$$C = 25 + 0.01n$$

where C is the cost in £ and n the number of minutes used.

If 150 minutes are used in the month, what is the cost in £ for that month?

(Your answer should be a number, without units.)

Answer:

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Question 14

From the following list, select the two statements which are correct.

Options

- A** $-5 = -1$ **B** $-1 > -5$ **C** $-5 > -1$
D $-5 < -1$ **E** $-1 < -5$

Answer:

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Question 15

According to the United Nations Economic Commission for Europe Regulation No 39, a speedometer should never display a speed LESS THAN the true speed nor MORE THAN the true speed plus one tenth of the true speed plus 4 km/h.

If the true speed is 70 km/h, select the one inequality below for the range of speeds, v km/h that can be displayed on the speedometer (to the nearest whole number).

Options

- A** $70 \leq v \leq 74$
B $70 \leq v < 81$
C $70 > v > 81$
D $74 \leq v \geq 81$
E $70 \leq v \leq 81$
F $v < 70$ and $v > 81$
G $74 < v < 81$

Answer:

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Unit 3 practice quiz questions

Question 1

What is the largest prime factor of 36?

(Your answer should be a number.)

Answer:

Question 2

Using prime factors or otherwise, find the lowest common multiple (LCM) of 40 and 52.

(Your answer should be a number.)

Answer:

Question 3

Choose the option which is the result of simplifying $(2^2 \times 2^3)^4$.

Options

A 2^{10} B 2^{20} C 2^9 D 2^{24}

Answer:

Question 4

Choose the option which is the result of simplifying $\frac{5^2 \times 5^3}{5^4}$.

Options

A 5^5 B 5^1 C $5^{3/2}$ D 5^{24}

Answer:

Question 5

Multiply $3\frac{3}{8}$ by $1\frac{7}{29}$ and select the option that gives the answer as an improper fraction in its simplest form.

Options

A $\frac{243}{58}$ B $\frac{87}{32}$ C $\frac{783}{288}$ D $\frac{972}{232}$ E $2\frac{23}{32}$ F $4\frac{11}{58}$

Answer:

Question 6

Divide $3\frac{3}{8}$ by $1\frac{7}{29}$ and select the option that gives the answer as an improper fraction in its simplest form.

Options

A $\frac{972}{232}$ B $\frac{243}{58}$ C $4\frac{11}{58}$ D $2\frac{23}{32}$ E $\frac{87}{32}$ F $\frac{783}{288}$

Answer:

Question 7

What is the reciprocal of $\frac{4}{3}$? Write your answer as a decimal number, rounded to two decimal places if necessary.

Answer:

Practice quizzes for Units 1 to 4 (Set 2)

Question 8

What is the value of the power of 10 when the number 0.000 000 095 73 is expressed in scientific notation?

Enter your answer as an integer in the box below.

Answer:

Question 9

What is the result of the following calculation, expressed in scientific notation?

$$(5.3 \times 10^{-2}) \times (4.3 \times 10^4)$$

Options

- A 0.2279×10^4 B 2.279×10^3 C 2.279×10^7
D 22.79×10^6 E 22.79×10^2

Answer:

Question 10

What is the result of the following calculation, expressed in scientific notation? Choose the answer that is correct to four decimal places.

$$\frac{(8.7 \times 10^{-9}) \times (7.1 \times 10^{-7})}{9.5 \times 10^{-6}}$$

Options

- A 6.5021×10^{-10} B 0.6502×10^{-11} C 6.5021×10^{-22}
D 65.0211×10^{-9} E 6.5021×10^{-16}

Answer:

Question 11

The number $\sqrt{147}$ simplifies to a number of the form $\square\sqrt{3}$. What is the value of the number in front of the square root?

Enter your answer as an integer in the box below.

Answer:

Question 12

Select the option that gives the simplified form of $8\sqrt{14} \times 7\sqrt{35}$.

Options

- A $56\sqrt{10}$ B $7\sqrt{10}$ C $2744\sqrt{10}$ D $392\sqrt{10}$ E $56\sqrt{490}$

Answer:

Question 13

The sum of £200 is to be shared between two people in the ratio 3:7.

Select the option that gives the corresponding amounts received, to the nearest pound.

Options

- A £67, £29 B £60, £140 C £140, £60
D £29, £67 E £67, £133

Answer:

Unit 4 practice quiz questions

Question 1

Which **two** of the following activities correspond to the 'T' stage of the PCAI cycle?

Options

- A Calculating the median number of traffic accidents per year.
- B Determining how fast a driver must go to be classed as speeding.
- C Finding the longest time it took members of a group to walk 30m.
- D Time how long it takes people to walk 50m.
- E Concluding a school is performing satisfactorily
- F Deciding how frequently a person needs to read a newspaper to count as a regular reader.
- G Recommending a change in practise of an organisation.
- H Getting a group of students to take an intelligence test.

Answer:

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Question 2

Which **three** of the following variables are discrete?

Options

- A league position of a football team
- B depth of a swimming pool
- C telephone dialling codes of members of a tutor group
- D seat number on a train
- E temperature in central London
- F percentage of oxygen in the atmosphere

Answer:

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Question 3

What is the mean of the following set of data values?

−4.5, 6.7, 8.9, 0, 4.3, −2.5, −3.4, 0, 3.4, 6.5, 1.4, 6.7, 3.2.

Give your answer as a decimal number correct to **two** decimal places.

Answer:

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Question 4

What is the median of the following set of data values?

−3.4, 5.7, 0, 4.4, −3.2, 0, 3.8, 4.5, −1.3.

(Your answer should be a number.)

Answer:

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Question 5

What is the median of the following set of data values?

3.5, 4.2, 5.5, 6.1, 6.1, 6.6, 7.4, 8.3, 8.7, 9.2, 9.6, 10.0.

(Your answer should be a number.)

Answer:

Question 6

Using the course tool Dataplotter (which can be accessed on the course website), what is the median of the data values listed below?

Give your answer as a decimal number correct to **one** decimal place.

Answer:

67
57
77
77
52
67
92
82
93
58
79
63
94
64
98
58
72
63
98
78
64
54
66
70

Question 7

What is the range of the following set of data values?

-4.5, 56.7, 7.4, 0, 4.2, -6.7, 9.2, 0.

(Your answer should be a number.)

Answer:

Question 8

What is the first quartile of the following data set?

25.3, 17.5, 37.7, 28.3, 18.5, 39.2, 30.0, 20.1, 11.4, 32.4, 12.7, 2.9.

(Your answer should be a number.)

Answer:

Question 9

What is the third quartile of the following data set?

34.4, 33.2, 34.7, 23.3, 13.5, 24.5, 23.0, 17.1, 16.4, 32.6, 11.6, 6.8.

(Your answer should be a number.)

Answer:

Question 10

What is the interquartile range of the following data set?

23.5, 35.2, 18.4, 18.7, 23.5, 34.2, 30.0, 19.7, 19.3, 15.3, 17.9, 11.5.

(Your answer should be a number)

Answer:

Question 11

Using Dataplotter (which can be accessed on the course website), find the standard deviation of the following set of data values and give your answer correct to **one** decimal place below.

70
57
77
77
51
82
93
58
79
63
94
64
98
58
70
63
98
78
64
54
66
70
83
63
79
43
45
73
57

Answer:

(Your answer should be a number.)

Unit 1 practice quiz solutions

Solution 1

Correct answer :

Using the BIDMAS rule we can evaluate the expression in steps starting with the division and then the subtraction.

$$40 - 16 \div 8 = 40 - 2 = 38$$

See Unit 1, Subsection 2.1.

Solution 2

Correct option :

The solution is worked out stepwise using BIDMAS as follows

$$\begin{aligned} 7 + 8 \times 2 + 3 \\ = 7 + 16 + 3 \\ = 26 \end{aligned}$$

See Unit 1, Subsection 2.1.

Solution 3

Correct option :

Correct option :

Since 1 g = 0.001 kg,

$$67 \text{ g} = (67 \times 0.001) \text{ kg} = 0.067 \text{ kg}.$$

Also, 1 g = 1000 mg,

$$67 \text{ g} = (67 \times 1000) \text{ mg} = 67000 \text{ mg}.$$

The two correct answers are thus 0.067 kg and 67000 mg.

See Unit 1, Subsection 2.3.

Solution 4

Matching pairs:

5.01628 rounded to 4 decimal places is	5.0163
5.01628 rounded to 2 decimal places is	5.02
5.01628 rounded to 1 decimal place is	5.0

Rounding 5.01628 to four decimal places gives 5.0163.

Rounding 5.01628 to two decimal places gives 5.02.

Rounding 5.01628 to one decimal place gives 5.0.

See Unit 1, Subsection 2.4.

Solution 5

Correct answer :

There are many ways of making a quick estimate of the cost. This answer presents one way of doing this where we first round the entrance fees to the nearest pound.

In this question both of the given prices round upwards to the next whole pound to give approximately 6 for the adult entrance fee and 3 for the child entrance fee.

So the estimated cost for the 3 adults is $3 \times 6 = 18$ pounds.

The estimated cost for the 3 children is $3 \times 3 = 9$ pounds.

So the estimated cost is $18 + 9 = 27$ pounds.

(Your answer will be marked correct for estimates around this figure, as there is not a precise answer to this question.)

See Unit 1, Subsection 2.5.

Solution 6

Matching pairs:

$7 - (-4)$	11
$7 + (-4)$	3
$(-7) \times (-4)$	28
$7 \times (-4)$	-28
$8 \div (-4)$	-2

To subtract a negative number, we add the corresponding positive number, so

$$7 - (-4) = 7 + 4 = 11.$$

To add a negative number, we subtract the corresponding positive number, so

$$7 + (-4) = 7 - 4 = 3.$$

When two negative numbers are multiplied together the answer is positive, so

$$(-7) \times (-4) = 28.$$

When a positive number is multiplied by a negative number the answer is negative, so

$$7 \times (-4) = -28.$$

When a positive number is divided by a negative number the answer is negative, so

$$8 \div (-4) = -2.$$

See Unit 1, Subsection 3.1.

Solution 7

Correct option : A

20 of the 24 children voted, which gives a fraction $\frac{20}{24}$.

This fraction is not in its lowest terms since the numerator and denominator of the fraction have 4 as a common factor.

Dividing the numerator and denominator by 4 gives the fraction in its lowest terms as $\frac{5}{6}$.

See Unit 1, Subsection 3.2.

Solution 8

Matching pairs:

Numerator:	3
Denominator:	4

The fraction of fathers who worried about the future is $\frac{75}{100}$.

The numerator and denominator of this fraction have a common factor of 25.

Dividing through by this common factor gives the fraction in simplest terms as $\frac{3}{4}$.

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So the numerator of the fraction is 3 and the denominator is 4.

See Unit 1, Subsection 3.2.

Solution 9

Correct answer :

$\frac{5}{6}$ of the 30 adults said roses were their favourite.

This gives $30 \times \frac{5}{6} = 5 \times 5 = 25$ adults who said that roses were their favourite flower.

This leaves $30 - 25 = 5$ who prefer other flowers.

See Unit 1, Subsection 3.2.

Solution 10

Correct answer :

The fraction $\frac{8}{9}$ when expressed as a decimal number is 0.888888889.

Rounding this to two decimal places, the required answer is 0.89.

See Unit 1, Subsection 3.2.

Solution 11

Correct answer :

If the price is reduced by 20 percent then since $100 - 20 = 80$ we have that 80 percent of the price remains.

So the final price (in £) is:

$$70 \times \frac{80}{100} = 56.$$

See Unit 1, Subsection 3.3.

Solution 12

Correct answer :

The course contains 4 TMAs.

See either the Course Guide or the Course Website.

Unit 2 practice quiz solutions

Solution 1

Correct answer : 25000

1 cm on the map represents 250 m on the ground.

$$\begin{aligned} 250 \text{ m} &= (250 \times 100) \text{ cm} \\ &= 25000 \text{ cm.} \end{aligned}$$

Thus the map scale is 1:25000 and so the scale factor is 25000.

See Unit 2, Subsection 1.2.

Solution 2

Correct answer : 6250

1 cm on the map represents 625000 cm on the ground.

Now,

$$\begin{aligned} 625000 \text{ cm} &= (625000 \div 100) \text{ m} \\ &= 6250 \text{ m.} \end{aligned}$$

So the distance on the ground is 6250 m, and the map scale could be written:

‘1 cm represents 6250 m’.

See Unit 2, Subsection 1.2.

Solution 3

Correct answer : 31250

The ground distance is:

$$\begin{aligned} (5.0 \times 625000) \text{ cm} &= 3125000 \text{ cm} \\ &= (3125000 \div 100) \text{ m} \\ &= 31250 \text{ m.} \end{aligned}$$

So the distance on the ground is 31250 m.

See Unit 2, Subsection 1.2.

Solution 4

Correct answer : 0.8

The ground distance is:

$$\begin{aligned} 5 \text{ km} &= (5 \times 1000 \times 100) \text{ cm} \\ &= 500000 \text{ cm.} \end{aligned}$$

So the map distance is

$$(500000 \div 625000) \text{ cm} = 0.8 \text{ cm.}$$

Hence the corresponding distance on the map is 0.8 cm.

See Unit 2, Subsection 1.2.

Solution 5

Correct answer : 105

The average speed is given by $\frac{\text{distance}}{\text{time}}$ which in this case is $\frac{70}{40}$ km/min.

Practice quizzes for Units 1 to 4 (Set 2)

Since there are 60 minutes in 1 hour, the average speed is

$$\left(\frac{70}{40} \times 60\right) \text{ km/h} = 105 \text{ km/h.}$$

See Unit 2, Subsection 1.3.

Solution 6

Correct answer :

The time taken is 5 minutes to 3pm and 21 minutes to 3:21 pm, giving a total time of 26 minutes.

So the average speed is given by

$$\begin{aligned} \frac{\text{distance}}{\text{time}} &= \frac{2.0}{26} \text{ km/min} \\ &= \left(\frac{2.0}{26} \times 60\right) \text{ km/h} \\ &= 4.615 \text{ km/h.} \end{aligned}$$

So the average speed is 4.6 km/h (to 2 s.f.).

See Unit 2, Subsection 1.3.

Solution 7

Correct answer :

Using the formula, $\text{time} = \frac{\text{distance}}{\text{average speed}}$ gives

$$\text{time} = \frac{60}{95} \text{ hours.}$$

Multiplying by 60 to convert the time to minutes gives

$$\begin{aligned} \text{time} &= \left(\frac{60}{95} \times 60\right) \text{ minutes} \\ &= 37.9 \text{ minutes.} \end{aligned}$$

To the nearest minute, this gives 38 minutes.

See Unit 2, Subsection 1.4.

Solution 8

Correct answer :

In 1 second, the distance travelled is $27 \text{ m} = (27 \div 1000) \text{ km} = 0.027 \text{ km}$.

So in 1 hour, the distance travelled is $(0.027 \times 60 \times 60) \text{ km} = 97.2 \text{ km}$.

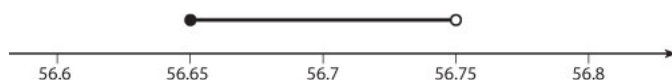
Hence to the nearest integer, the speed is 97 km/h.

See Unit 2, Subsection 2.2.

Solution 9

Correct option :

The values which round to 56.7 to 3 significant figures are shown on the number line below:



So the correct option is $56.65 \leq v < 56.75$.

See Unit 2, Section 4.

Solution 10

Matching pairs:

$6c + 3$	Multiply the number by 6 and then add 3.
$(c - 5)^2$	Subtract 5 from the number and then square your answer.
$6(c + 3)$	Add 3 to the number and multiply your answer by 6.
$c^2 - 5$	Square the number and then subtract 5.

If you substitute a number into $6c + 3$, you multiply by 6 and then add 3, since multiplication is carried out before addition.

If you substitute a number into $(c - 5)^2$, you work out the bracket first. So you subtract 5 from the number, and then square the answer.

If you substitute a number into $6(c + 3)$, you work out the bracket first. So the first step is to add 3, then multiply the answer by 6.

If you substitute a number into $c^2 - 5$, you work out the power first. So the first step is to square the number and then subtract 5.

See Unit 2, Subsection 3.1.

Solution 11

Correct answer : 33.10000000

When $n = 3.8$, the expression becomes

$$\begin{aligned}
 6 \times (3.8) + 2 + \frac{333.66}{6+9 \times (3.8)} &= 22.8 + 2 + \frac{333.66}{40.2} \\
 &= 22.8 + 2 + 8.3 \\
 &= 33.1.
 \end{aligned}$$

See Unit 2, Section 3.2.

Solution 12

Matching pairs:

$8(3 - 2n) + 2$	6.8
$8(3n)^4$	1343.693
$(8 + 3n)^3$	1560.896
$\frac{8+3n}{2}$	5.8
$\frac{8}{2+3n}$	1.429

When $n = 1.2$:

$$\begin{aligned}
 8(3 - 2n) + 2 &= 8 \times (3 - 2 \times (1.2)) + 2 \\
 &= 8 \times (3 - 2.4) + 2 \\
 \text{(a)} \quad &= 8 \times (0.6) + 2 \\
 &= 6.8
 \end{aligned}$$

$$\begin{aligned}
 8(3n)^4 &= 8(3 \times (1.2))^4 \\
 &= 8(3.6)^4 \\
 \text{(b)} \quad &= 8 \times (167.9616) \\
 &= 1343.693
 \end{aligned}$$

$$\begin{aligned}
 (8 + 3n)^3 &= (8 + 3 \times (1.2))^3 \\
 &= (8 + 3.6)^3 \\
 \text{(c)} \quad &= (11.6)^3 \\
 &= 1560.896
 \end{aligned}$$

$$\begin{aligned}
 \frac{8+3n}{2} &= \frac{8+3 \times (1.2)}{2} \\
 &= \frac{8+3.6}{2} \\
 \text{(d)} \quad &= \frac{11.6}{2} \\
 &= 5.8
 \end{aligned}$$

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$$\begin{aligned} \frac{8}{2+3n} &= \frac{8}{2+3(1.2)} \\ (e) \quad &= \frac{8}{2+3.6} \\ &= \frac{8}{5.6} \\ &= 1.429 \end{aligned}$$

See Unit 2, Subsection 3.2.

Solution 13

Correct answer :

When $n = 150$,

$$C = 25 + 0.01 \times 150 = 25 + 1.5 = 26.5.$$

So the cost is £26.50.

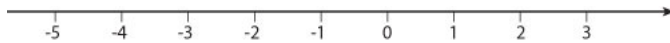
See Unit 2, Subsection 3.2.

Solution 14

Correct option :

Correct option :

From the number line below, we can see that the number -1 is to the right of -5, so -1 is greater than -5.



Hence the inequality is $-1 > -5$.

Another way of writing this is $-5 < -1$.

See Unit 2, Section 4.

Solution 15

Correct option :

The lower limit is 70 and this value can be displayed.

One tenth of the speed is $70 \div 10 = 7$, and so the upper limit is $70 + 7 + 4 = 81$. This value can also be displayed.

So the inequality is $70 \leq v \leq 81$.

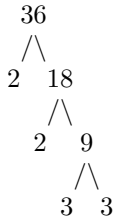
See Unit 2, Section 4.

Unit 3 practice quiz solutions

Solution 1

Correct answer : 3

Start by drawing the factor tree for 36:



From the factor tree we see that the number 36 factorises as $2^2 \times 3^2$.

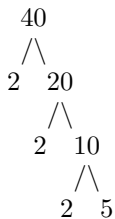
So the largest prime factor is 3.

See Unit 3, Subsection 1.4.

Solution 2

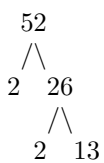
Correct answer : 520

Start by working out the prime factorisation of 40. One way of doing this is to draw a factor tree as follows



So the prime factorisation of 40 is $2^3 \times 5$.

Now we do the same for 52, starting with the factor tree:



So the prime factorisation of 52 is $2^2 \times 13$.

What we need to do now is to find the highest power of each prime factor occurring in any of the numbers. One way of doing this is to write the two factorisations one above another, lining up the primes in each case, as follows.

$$\begin{array}{rcc}
 & 2 & 5 & 13 \\
 40 & 2^3 & 5 & \\
 52 & 2^2 & & 13
 \end{array}$$

The highest power of each prime appearing in both factorisations is $2^3 \times 5 \times 13$.

So the lowest common multiple is 520.

See Unit 3, Subsection 1.4.

Solution 3

Correct option : B

Practice quizzes for Units 1 to 4 (Set 2)

Powers of the same base number are multiplied together by adding the indices, that is,

$$a^x \times a^y = a^{x+y}.$$

In addition, powers of a power are simplified by multiplying the indices, such as

$$(a^x)^y = a^{x \times y}.$$

Hence we have $(2^2 \times 2^3)^4 = (2^{2+3})^4 = 2^{5 \times 4} = 2^{20}$.

See Unit 3, Subsection 1.5.

Solution 4

Correct option : B

Powers of the same base number are multiplied together by adding the indices, that is,

$$a^x \times a^y = a^{x+y}.$$

Powers of the same base number are divided by subtracting the indices, that is,

$$\frac{a^x}{a^y} = a^{x-y}.$$

Hence we have $\frac{5^2 \times 5^3}{5^4} = 5^{2+3-4} = 5^1$.

See Unit 3, Subsection 1.5.

Solution 5

Correct option : A

Start by converting the mixed fractions into improper fractions. The mixed fraction $3\frac{3}{8}$ equals $\frac{27}{8}$ and the mixed fraction $1\frac{7}{29}$ equals $\frac{36}{29}$.

So the expression to calculate is

$$\frac{27}{8} \times \frac{36}{29}$$

Now cancel common factors to get:

$$\frac{27}{2} \times \frac{9}{29}.$$

Multiplying the numerators and denominators separately gives

$$\frac{243}{58}.$$

See Unit 3, Subsection 2.3.

Solution 6

Correct option : E

Start by converting the mixed fractions into improper fractions. The mixed fraction $3\frac{3}{8}$ equals $\frac{27}{8}$ and the mixed fraction $1\frac{7}{29}$ equals $\frac{36}{29}$.

So the expression to calculate is

$$\frac{27}{8} \div \frac{36}{29}$$

To divide by a fraction we invert the fraction and multiply, so the expression to calculate is

$$\frac{27}{8} \times \frac{29}{36}$$

Now cancel common factors to get:

$$\frac{3}{8} \times \frac{29}{4}.$$

Multiplying the numerators and denominators separately gives

$$\frac{87}{32}.$$

See Unit 3, Subsection 2.3.

Solution 7

Correct answer : 0.75

This reciprocal of $\frac{4}{3}$ is one divided by the fraction and is obtained by inverting the fraction to get $\frac{3}{4}$. Performing the division gives:

$$\frac{3}{4} = 0.75$$

So the answer is 0.75.

See Unit 3, Subsection 2.3.

Solution 8

Correct answer : -8

Scientific notation is where a number is written as a number between 1 and 10 multiplied by a power of ten. In this case

$$0.000\,000\,095\,73 = 9.573 \times 10^{-8}$$

So the answer is -8 .

See Unit 3, Subsection 2.5.

Solution 9

Correct option : B

The first step is to multiply together the two decimal parts and to add the powers of 10:

$$(5.3 \times 10^{-2}) \times (4.3 \times 10^4) = (5.3 \times 4.3) \times 10^{-2+4} = 22.79 \times 10^2.$$

Putting this number into scientific notation means adjusting it so that the decimal part is within the range from 1 to 10 (excluding 10 itself), with a corresponding adjustment to the power of 10. The result obtained is

$$2.279 \times 10^3.$$

See Unit 3, Subsection 2.5.

Solution 10

Correct option : A

Using the laws of numbers and indices,

$$\frac{(8.7 \times 10^{-9}) \times (7.1 \times 10^{-7})}{9.5 \times 10^{-6}} = \frac{8.7 \times 7.1}{9.5} \times 10^{-9-7-(-6)} = 6.502105263 \times 10^{-10}.$$

Putting this number into scientific notation means adjusting it so that the decimal part is within the range from 1 to 10 (excluding 10 itself), with a

Practice quizzes for Units 1 to 4 (Set 2)

corresponding adjustment to the power of 10. The result obtained, with the decimal part rounded to four decimal places, is

$$6.5021 \times 10^{-10}.$$

See Unit 3, Subsection 2.5.

Solution 11

Correct answer :

First factorise 147 as 49×3 then the square root can be simplified as follows

$$\sqrt{147} = \sqrt{49 \times 3} = \sqrt{49} \times \sqrt{3} = 7\sqrt{3}$$

So the answer is 7.

See Unit 3, Subsection 3.3.

Solution 12

Correct option :

Start by multiplying the numbers together and multiplying the roots together using the rule $\sqrt{a} \times \sqrt{b} = \sqrt{a \times b}$:

$$8\sqrt{14} \times 7\sqrt{35} = 8 \times 7\sqrt{14 \times 35} = 56 \times \sqrt{14 \times 35}$$

Now consider the number under the square root sign. Now 14 factorises as 2×7 and 35 factorises as 5×7 , so therefore 14×35 factorises as $2 \times 5 \times 7^2$. So the largest square number that is a factor of this number is 49, so the expression is equivalent to $56\sqrt{49 \times 10}$.

This simplifies to $56\sqrt{49}\sqrt{10}$.

So the required answer is $392\sqrt{10}$.

See Unit 3, Subsection 3.3.

Solution 13

Correct option :

The problem is to divide £200 in the ratio 3:7.

The total number of parts is $3+7=10$,

so each part is 'worth' $\pounds \frac{200}{10} = \pounds 20$.

Hence the first person receives $\pounds 3 \times 20 = \pounds 60$,

and the second person receives $\pounds 7 \times 20 = \pounds 140$.

See Unit 3, Subsection 4.1.

Unit 4 practice quiz solutions

Solution 1

Correct option :

Correct option :

The following activities are within I (interpretation) stage of the PCAI cycle: 'Recommending a change in practise of an organisation.' and 'Concluding a school is performing satisfactorily'

'Finding the longest time it took members of a group to walk 30m.' and 'Calculating the median number of traffic accidents per year.' are within the A (analysing) stage, 'Deciding how frequently a person needs to read a newspaper to count as a regular reader.' and 'Determining how fast a driver must go to be classed as speeding.' are within the P (posing) stage and 'Time how long it takes people to walk 50m.' and 'Getting a group of students to take an intelligence test.' are within the C (collecting data) stage.

See Unit 4, Subsection 1.2.

Solution 2

Correct option :

Correct option :

Correct option :

The following variables are discrete: 'league position of a football team', 'telephone dialling codes of members of a tutor group' and 'seat number on a train' because they can take only certain specific values.

The remainder 'temperature in central London', 'depth of a swimming pool' and 'percentage of oxygen in the atmosphere' are continuous variables because they can take *any* value within a certain range.

See Unit 4, Subsection 2.2.

Solution 3

Correct answer :

The mean is found by adding up the numbers, and dividing the total by the number of data items.

So,

$$\begin{aligned}\text{mean} &= \frac{-4.5 + 6.7 + 8.9 + 0 + 4.3 + (-2.5) + (-3.4) + 0 + 3.4 + 6.5 + 1.4 + 6.7 + 3.2}{13} \\ &= \frac{30.7}{13} \\ &= 2.361538.\end{aligned}$$

Hence the mean of the data is 2.36 (to 2 d.p.).

See Unit 4, Subsection 3.2.

Solution 4

Correct answer :

Practice quizzes for Units 1 to 4 (Set 2)

The median is found by first arranging the data in increasing order and then, since there are an odd number of data items, taking the middle value.

The sorted data list is

$-3.4, -3.2, -1.3, 0, 0, 3.8, 4.4, 4.5, 5.7$

and hence the median is 0.

See Unit 4, Subsection 3.2.

Solution 5

Correct answer :

The median is found arranging the data in increasing order and, since in this case the number of data items is even, taking the value half way between the middle two data items.

Since the data list is already sorted, the middle two items are 6.6 and 7.4 and hence the median is 7.

See Unit 4, Subsection 3.2.

Solution 6

Correct answer :

By entering the data into Dataplotter, we can see that the median is 68.5 (to 1 d.p.).

Alternatively, the median is found arranging the data in increasing order and, since in this case the number of data items is even, taking the value half way between the middle two data items.

The sorted data list is,

52, 54, 57, 58, 58, 63, 63, 64, 64, 66, 67, 67, 70, 72, 77, 77, 78, 79, 82, 92, 93, 94, 98, 98

and so the middle two entries are 67 and 70. The median is thus 68.5.

See Unit 4, Subsection 3.2.

Solution 7

Correct answer :

The range is the difference between the largest and smallest data values.

In this case the largest value is 56.7 and the smallest is -6.7 . The difference between these is $56.7 - (-6.7) = 63.4$.

So the range is 63.4.

See Unit 4, Subsection 4.1.

Solution 8

Correct answer :

We first write the data in increasing order,

2.9, 11.4, 12.7, 17.5, 18.5, 20.1, 25.3, 28.3, 30.0, 32.4, 37.7, 39.2.

Since there are an even number of data items, the median is half way between the two middle values which are 20.1 and 25.3. The median is thus 22.7 .

The data less than (and excluding) the median, is then,

2.9, 11.4, 12.7, 17.5, 18.5, 20.1

and since there are an even number of items in this list, the median of this list is half way between the two middle values which are 12.7 and 17.5, giving 15.1.

Thus the first quartile is 15.1.

See Unit 4, Subsection 4.2.

Solution 9

Correct answer : 32.9

We first write the data in increasing order,

6.8, 11.6, 13.5, 16.4, 17.1, 23.0, 23.3, 24.5, 32.6, 33.2, 34.4, 34.7

Since there are an even number of data items, the median is half way between the two middle values which are 23.0 and 23.3. The median is thus 23.15 .

The data greater than (and excluding) the median, is then,

23.3, 24.5, 32.6, 33.2, 34.4, 34.7

and since there are an even number of items in this list, the median of this list is half way between the two middle values which are 32.6 and 33.2, giving 32.9.

Thus the third quartile is 32.9.

See Unit 4, Subsection 4.2.

Solution 10

Correct answer : 8.60

We first write the data in increasing order,

11.5, 15.3, 17.9, 18.4, 18.7, 19.3, 19.7, 23.5, 23.5, 30.0, 34.2, 35.2.

Since there are an even number of data items, the median is half way between the two middle values which are 19.3 and 19.7. The median is thus 19.5 .

We can then find the first quartile by considering the data less than (and excluding) the median, that is: 11.5, 15.3, 17.9, 18.4, 18.7, 19.3.

Since there are an even number of items in this list, the median of this list is half way between the two middle values which are 17.9 and 18.4, giving 18.15.

Thus the first quartile is 18.15.

By considering the part of the original data set greater than (and excluding) its mean, that is, 19.7, 23.5, 23.5, 30.0, 34.2, 35.2, we can find the third quartile.

As there are an even number of items in this list, the median of this list is half way between the two middle values which are 23.5 and 30.0, giving 26.75.

The third quartile is this 26.75.

The interquartile range is the difference between the quartiles, which is $26.75 - 18.15 = 8.60$.

So the interquartile range is 8.60.

See Unit 4, Subsection 4.2.

Solution 11

Correct answer : 14.6

Using Dataplotter, the standard deviation to one decimal place is 14.6.

See Unit 4, Subsection 4.3.